

IN THE CLAIMS:

Please amend claims 75 and 104, without prejudice, as indicated on the following listing of all the claims in the present application after this amendment.

1. (Original) A method for finding a profile of a structure on and/or below one or more layers of material, said structure having a dimension in the micron or sub-micron range and fabricated by a process, wherein a measurement is carried out by directing a polychromatic beam of electromagnetic radiation at said structure and detecting at a number of wavelengths corresponding radiation data from said beam after it has been modified by the structure and the one or more layers, comprising:

providing a gallery of profile types, each profile type and the one or more layers associated with a set of one or more parameters and a set of radiation data at the number of wavelengths;

selecting a profile type from the gallery based on information on the process;

carrying out a measurement of the structure to obtain measured radiation data from said beam after it has been modified by the structure and the one or more layers; and

comparing the measured radiation data to the set of radiation data associated with the selected profile type to arrive at a set of value(s) of the one or more parameters.

2. (Original) The method of claim 1, wherein said providing provides a gallery where at least one of the profile types is defined using a polynomial function.

3. (Original) The method of claim 2, wherein said providing provides a gallery where at least one of the profile types is defined using a quartic parabola or a combination of quartic and quadratic parabolas.

4. (Original) The method of claim 1, wherein said at least one profile type comprises a periodic structure having a plurality of layers of material with different optical properties.

5. (Original) The method of claim 1, wherein said selecting includes simulating a profile using information concerning a fabrication process, and comparing the simulated profile to the gallery to select a profile type in the gallery that is a match to the simulated profile.

6. (Original) The method of claim 5, wherein said selecting further includes selecting an initial set of values of the one or more parameters of the selected profile type based on the comparison between the simulated profile and the selected profile type.

7. (Original) The method of claim 6, further comprising generating a set of radiation data associated with the selected profile type using the initial set of values.

8. (Original) The method of claim 1, wherein at least one of said profile types has bottom footers.

9. (Original) The method of claim 1, wherein said providing provides a gallery where at least one profile type in the gallery includes one or more slabs defined by an analytical function.

10. (Original) The method of claim 9, wherein said providing provides a gallery where at least one profile type in the gallery includes one or more rectangular or trapezoidal slabs.

11. (Original) The method of claim 1, wherein at least one of said profile types has one or more sidewall spacers or a three-dimensional structure.

12. (Original) The method of claim 11, wherein said sidewall spacers are composed of a material different from that of the slab(s).

13. (Original) The method of claim 1, wherein said providing provides a gallery where at least one of the profile types is defined by means of a multi-slab model.

14. (Original) The method of claim 1, wherein said one or more parameters include one or more of the following: width, height and sidewall angle, thickness and index of refraction.

15. (Original) The method of claim 1, wherein said comparing includes applying a non-linear optimization process.

16. (Original) The method of claim 1, wherein said profile types provided are associated with a set of radiation data related to reflectance, transmittance or ellipsometric parameters of the profile type.

17. (Original) The method of claim 1, wherein at least one of said profile types provided is associated with a plurality of sets of radiation data of different radiation parameters, said radiation parameters including reflectance or transmittance parameters and ellipsometric parameters of the profile type, said method further comprising selecting at least one radiation parameter and at least one set of radiation data based on sensitivity of such data to a change in the one or more parameters of the profile type and/or of the one or more layers.

18. (Original) The method of claim 1, wherein the comparing arrives at a set of value(s) of the one or more parameters of the selected profile type and/or of the one or more layers.

19. (Original) A method for finding a profile of a structure on and/or below one or more layers of material, said structure having a dimension in the micron or sub-micron range and fabricated by a process, wherein a measurement is carried out by directing a polychromatic beam of electromagnetic radiation at said structure and detecting at a number of wavelengths corresponding radiation data from said beam after it has been modified by the structure, comprising:

providing a gallery of a plurality of profile types, each profile type and the one or more layers associated with a set of one or more parameters and a set of radiation data at the number of wavelengths, wherein at least one of said profile types provided is associated with a plurality of sets of radiation data of different radiation parameters, said different radiation parameters

including reflectance or transmittance parameters, and ellipsometric parameters of the profile type;

selecting a profile type from the gallery, at least one radiation parameter and at least one set of radiation data associated with such profile type based on sensitivity of such data to a change in the one or more parameters of the profile type and/or of the one or more layers;

carrying out a measurement of the structure to obtain measured radiation data from said beam after it has been modified by the structure at the number of wavelengths; and

comparing the measured radiation data to the at least one set of radiation data associated with the selected profile type to arrive at a set of value(s) of the one or more parameters.

20. (Original) The method of claim 19, wherein said selecting selects a radiation parameter and one or more sets of radiation data based on sensitivity of such data to a change in the profile parameters associated with the profile type and/or with the one or more layers.

21. (Original) The method of claim 19, wherein said providing provides a gallery where at least one of the profile types is defined using a polynomial function.

22. (Original) The method of claim 21, wherein said providing provides a gallery where at least one of the profile types is defined using a quartic parabola or a combination of quartic and quadratic parabolas.

23. (Original) The method of claim 19, wherein said at least one profile type comprises a periodic structure having a plurality of layers of material with different optical properties.

24. (Original) The method of claim 19, wherein said selecting includes simulating a profile using information concerning a fabrication process, and comparing the simulated profile to the gallery to select a profile type in the gallery that is a match to the simulated profile.

25. (Original) The method of claim 24, wherein said selecting further includes selecting an initial set of values of the one or more parameters of the selected profile type based on the comparison between the simulated profile and the selected profile type.

26. (Original) The method of claim 25, further comprising generating a set of radiation data associated with the selected profile type using the initial set of values.

27. (Original) The method of claim 19, wherein at least one of said profile types has bottom footers.

28. (Original) The method of claim 19, wherein said providing provides a gallery where at least one profile type in the gallery includes one or more slabs defined by an analytical function.

29. (Original) The method of claim 28, said providing provides a gallery where at least one profile type in the gallery includes one or more rectangular or trapezoidal slabs.

30. (Original) The method of claim 19, wherein at least one of said profile types has one or more sidewall spacers or a three-dimensional structure.

31. (Original) The method of claim 30, wherein said sidewall spacers are composed of a material different from that of the slab(s).

32. (Original) The method of claim 19, wherein said providing provides a gallery where at least one of the profile types is defined by means of a multi-slab model.

33. (Original) The method of claim 19, wherein said one or more parameters include one or more of the following: width, height and sidewall angle, thickness and index of refraction.

34. (Original) The method of claim 19, wherein said comparing includes applying non-linear optimization.

35. (Original) The method of claim 19, wherein said profile types provided are associated with a set of radiation data related to reflectance, transmittance or ellipsometric parameters of the profile type.

36. (Original) The method of claim 19, wherein the comparing arrives at a set of value(s) of the one or more parameters of the selected profile type and/or of the one or more layers.

49. (Original) A computer readable storage device embodying a program of instructions executable by a computer to perform a method for finding a profile of a structure on and/or below one or more layers of material, said structure having a dimension in the micron or sub-micron range and fabricated by a process, wherein a measurement is carried out by directing a polychromatic beam of electromagnetic radiation at said structure, detecting at a number of wavelengths corresponding radiation data from said beam after it has been modified by the structure and the one or more layers at a number of wavelengths to provide measured radiation data; said method comprising:

providing a gallery of a plurality of profile types, each profile type and the one or more layers associated with a set of one or more parameters and a set of radiation data at the number of wavelengths;

selecting a profile type from the gallery based on information on the process; and

comparing the measured radiation data to the set of radiation data associated with the selected profile type to arrive at a set of value(s) of the one or more parameters of the selected profile type and/or of the one or more layers.

50. (Original) The device of claim 49, wherein said providing provides a gallery where at least one of the profile types is defined using a quartic parabola or a combination of quartic and quadratic parabolas.

51. (Original) The device of claim 49, wherein said at least one profile type comprises a periodic structure having a plurality of layers of material with different optical properties.

52. (Original) The device of claim 49, wherein said selecting includes simulating a profile using information concerning a fabrication process, and comparing the simulated profile to the gallery to select a profile type in the gallery that is a match to the simulated profile.

53. (Original) The device of claim 52, wherein said selecting further includes selecting an initial set of values of the one or more parameters of the selected profile type based on the comparison between the simulated profile and the selected profile type.

54. (Original) The device of claim 53, further comprising generating a set of radiation data associated with the selected profile type using the initial set of values.

55. (Original) The device of claim 49, wherein at least one of said profile types has bottom footers.

56. (Original) The device of claim 49, said providing provides a gallery where at least one profile type in the gallery includes one or more slabs defined by an analytical function.

57. (Original) The device of claim 56, said providing provides a gallery where at least one profile type in the gallery includes one or more rectangular or trapezoidal slabs.

58. (Original) The device of claim 49, wherein at least one of said profile types has one or more sidewall spacers or a three-dimensional structure.

59. (Original) The device of claim 58, wherein said sidewall spacers are composed of a material different from that of the slab(s).

60. (Original) The device of claim 49, wherein said profile types provided are associated with a set of radiation data related to reflectance, transmittance or ellipsometric parameters of the profile type.

61. (Original) The device of claim 49, wherein at least one of said profile types provided is associated with a plurality of sets of radiation data of different radiation parameters, said radiation parameters including reflectance or transmittance parameters and ellipsometric parameters of the profile type, said method further comprising selecting at least one radiation parameter and at least one set of radiation data based on sensitivity of such data to a change in the one or more parameters of the profile type and/or of the one or more layers.

62. (Original) A computer readable storage device embodying a program of instructions executable by a computer to perform a method for finding a profile of a structure on and/or below one or more layers of material, said structure having a dimension in the micron or sub-micron range and fabricated by a process, wherein the system measures the structure by directing a polychromatic beam of electromagnetic radiation at said structure, detecting corresponding radiation data from said beam after it has been modified by the structure and the one or more layers at a number of wavelengths to provide measured radiation data; said method comprising:

providing a gallery of a plurality of profile types, each profile type and the one or more layers associated with a set of one or more parameters and a set of radiation data at the number of wavelengths, wherein at least one of said profile types provided is associated with a plurality of sets of radiation data of different radiation parameters, said different radiation parameters including reflectance or transmittance parameters and ellipsometric parameters;

selecting a profile type from the gallery, at least one radiation parameter and at least one set of radiation data based on sensitivity of such data to a change in the one or more parameters of the profile type and/or of the one or more layers; and

comparing the measured radiation data to the at least one set of radiation data associated with the selected profile type to arrive at a set of value(s) of the one or more parameters of the selected profile type.

63. (Original) The device of claim 62, wherein said providing provides a gallery where at least one of the profile types is defined using a quartic parabola or a combination of quartic and quadratic parabolas.

64. (Original) The device of claim 62, wherein said at least one profile type comprises a periodic structure having a plurality of layers of material with different optical properties.

65. (Original) The device of claim 62, wherein said selecting includes simulating a profile using information concerning a fabrication process, and comparing the simulated profile to the gallery to select a profile type in the gallery that is a match to the simulated profile.

66. (Original) The device of claim 65, wherein said selecting further includes selecting an initial set of values of the one or more parameters of the selected profile type based on the comparison between the simulated profile and the selected profile type.

67. (Original) The device of claim 66, further comprising generating a set of radiation data associated with the selected profile type using the initial set of values.

68. (Original) The device of claim 62, wherein at least one of said profile types has bottom footers.

69. (Original) The device of claim 62, wherein said providing provides a gallery where at least one profile type in the gallery includes one or more slabs defined by an analytical function.

70. (Original) The device of claim 69, wherein said providing provides a gallery where at least one profile type in the gallery includes one or more rectangular or trapezoidal slabs.

71. (Original) The device of claim 62, wherein at least one of said profile types has one or more sidewall spacers or a three-dimensional structure.

72. (Original) The device of claim 71, wherein said sidewall spacers are composed of a material different from that of the slab(s).

73. (Original) The device of claim 63, wherein said profile types provided are associated with a set of radiation data related to reflectance, transmittance or ellipsometric parameters of the profile type.

74. (Original) The device of claim 63, wherein at least one of said profile types provided is associated with a plurality of sets of radiation data of different radiation parameters, said radiation parameters including reflectance or transmittance parameters and ellipsometric

parameters of the profile type, said method further comprising selecting at least one radiation parameter and at least one set of radiation data based on sensitivity of such data to a change in the one or more parameters of the profile type and/or of the one or more layers.

75. (Currently Amended) A method for transmitting a program of instructions executable by a computer to perform a method for finding a profile of a structure on and/or below one or more layers of material, said structure having a dimension in the micron or sub-micron range and fabricated by a process, wherein ~~the system measures the structure a~~ measurement is carried out by directing a polychromatic beam of electromagnetic radiation at said structure, detecting corresponding radiation data from said beam after it has been modified by the structure and the one or more layers at a number of wavelengths to provide measured radiation data; said method comprising:

- causing a program of instructions to be transmitted to a client device, thereby enabling the client device to perform, by means of such program, the following process:

- providing a gallery of profile types, each profile type and the one or more layers associated with a set of one or more parameters and a set of radiation data at the number of wavelengths;

- selecting a profile type from the gallery based on information on the process; and

- comparing the measured radiation data to the set of radiation data associated with the selected profile type to arrive at a set of value(s) of the one or more parameters of the selected profile type to arrive at a set of value(s) of the one or more parameters.

76. (Original) The method of claim 75, wherein said providing provides a gallery where at least one of the profile types is defined using a quartic parabola or a combination of quartic and quadratic parabolas.

77. (Original) The method of claim 75, wherein said at least one profile type comprises a periodic structure having a plurality of layers of material with different optical properties.

78. (Original) The method of claim 75, wherein said selecting includes simulating a profile using information concerning a fabrication process, and comparing the simulated profile to the gallery to select a profile type in the gallery that is a match to the simulated profile.

79. (Original) The method of claim 78, wherein said selecting further includes selecting an initial set of values of the one or more parameters of the selected profile type based on the comparison between the simulated profile and the selected profile type.

80. (Original) The method of claim 79, further comprising generating a set of radiation data associated with the selected profile type using the initial set of values.

81. (Original) The method of claim 75, wherein at least one of said profile types has bottom footers.

82. (Original) The method of claim 75, wherein said providing provides a gallery where at least one profile type in the gallery includes one or more slabs defined by an analytical function.

83. (Original) The method of claim 82, said providing provides a gallery where at least one profile type in the gallery includes one or more rectangular or trapezoidal slabs.

84. (Original) The method of claim 75, wherein at least one of said profile types has one or more sidewall spacers or a three-dimensional structure.

85. (Original) The method of claim 84, wherein said sidewall spacers are composed of a material different from that of the slab(s).

86. (Original) The method of claim 75, wherein said profile types provided are associated with a set of radiation data related to reflectance, transmittance or ellipsometric parameters of the profile type.

87. (Original) The method of claim 75, wherein at least one of said profile types provided is associated with a plurality of sets of radiation data of different radiation parameters, said radiation parameters including reflectance or transmittance parameters and ellipsometric parameters of the profile type, said process further comprising selecting at least one radiation parameter and at least one set of radiation data based on sensitivity of such data to a change in the one or more parameters of the profile type and/or of the one or more layers.

88. (Original) A method for transmitting a program of instructions executable by a computer to perform a method for finding a profile of a structure on and/or below one or more layers of material, said structure having a dimension in the micron or sub-micron range and fabricated by a process, wherein the system measures the structure by directing a polychromatic beam of electromagnetic radiation at said structure, detecting corresponding radiation data from said beam after it has been modified by the structure and the one or more layers at a number of wavelengths to provide measured radiation data; said method comprising:

causing a program of instructions to be transmitted to a client device, thereby enabling the client device to perform, by means of such program, the following process:

providing a gallery of profile types, each profile type and the one or more layers associated with a set of one or more parameters and a set of radiation data at the number of wavelengths, wherein at least one of said profile types provided is associated with a plurality of sets of radiation data of different radiation parameters, said different radiation parameters including reflectance or transmittance parameters and ellipsometric parameters;

selecting a profile type from the gallery, at least one radiation parameter and at least one set of radiation data based on sensitivity of such data to a change in the one or more parameters of the profile type and/or of the one or more layers; and

comparing the measured radiation data to the at least one set of radiation data to arrive at a set of value(s) of the one or more parameters.

89. (Original) The method of claim 88, wherein said providing provides a gallery where at least one of the profile types is defined using a quartic parabola or a combination of quartic and quadratic parabolas.

90. (Original) The method of claim 88, wherein said at least one profile type comprises a periodic structure having a plurality of layers of material with different optical properties.

91. (Original) The method of claim 88, wherein said selecting includes simulating a profile using information concerning a fabrication process, and comparing the simulated profile to the gallery to select a profile type in the gallery that is a match to the simulated profile.

92. (Original) The method of claim 91, wherein said selecting further includes selecting an initial set of values of the one or more parameters of the selected profile type based on the comparison between the simulated profile and the selected profile type.

93. (Original) The method of claim 92, further comprising generating a set of radiation data associated with the selected profile type using the initial set of values.

94. (Original) The method of claim 88, wherein at least one of said profile types has bottom footers.

95. (Original) The method of claim 88, wherein said providing provides a gallery where at least one profile type in the gallery includes one or more slabs defined by an analytical function.

96. (Original) The method of claim 95, said providing provides a gallery where at least one profile type in the gallery includes one or more rectangular or trapezoidal slabs.

97. (Original) The method of claim 88, wherein at least one of said profile types has one or more sidewall spacers or a three-dimensional structure.

98. (Original) The method of claim 97, wherein said sidewall spacers are composed of a material different from that of the slab(s).

99. (Original) A method for finding a profile of a structure having a dimension in the micron or sub-micron range and fabricated by a process, wherein a measurement is carried out by directing a polychromatic beam of electromagnetic radiation at said structure and detecting at a number of wavelengths corresponding radiation data from said beam after it has been modified by the structure, comprising:

providing a gallery of profile types, each profile type associated with a set of one or more parameters and a set of radiation data at the number of wavelengths;

selecting a profile type from the gallery based on information on the process;

carrying out a measurement of the structure to obtain measured radiation data from said beam after it has been modified by the structure; and

comparing the measured radiation data to the set of radiation data associated with the selected profile type to arrive at a set of value(s) of the one or more parameters of the selected profile type.

100. (Original) A method for finding a profile of a structure, said structure having a dimension in the micron or sub-micron range and fabricated by a process, wherein a measurement is carried out by directing a polychromatic beam of electromagnetic radiation at said structure and detecting at a number of wavelengths corresponding radiation data from said beam after it has been modified by the structure, comprising:

providing a gallery of a plurality of profile types, each profile type associated with a set of one or more parameters and a set of radiation data at the number of wavelengths of different radiation parameters, wherein at least one of said profile types provided is associated with a plurality of sets of different radiation data, said different radiation parameters including reflectance or transmittance parameters, and ellipsometric parameters of the profile type;

selecting a profile type from the gallery, at least one radiation parameter and at least one set of radiation data associated with such profile type based on sensitivity of such data to a change in the one or more parameters;

carrying out a measurement of the structure to obtain measured radiation data from said beam after it has been modified by the structure at the number of wavelengths; and

comparing the measured radiation data to the at least one set of radiation data associated with the selected profile type to arrive at a set of value(s) of the one or more parameters of the selected profile type.

101. (Original) A computer readable storage device embodying a program of instructions executable by a computer to perform a method for finding a profile of a structure, said structure having a dimension in the micron or sub-micron range and fabricated by a process, wherein a measurement is carried out by directing a polychromatic beam of electromagnetic radiation at said structure, detecting at a number of wavelengths corresponding radiation data from said beam after it has been modified by the structure at a number of wavelengths to provide measured radiation data; said method comprising:

providing a gallery of a plurality of profile types, each profile associated with a set of one or more parameters and a set of radiation data at the number of wavelengths;

selecting a profile type from the gallery based on information on the process; and

comparing the measured radiation data to the set of radiation data associated with the selected profile type to arrive at a set of value(s) of the one or more parameters of the selected profile type.

102. (Original) A computer readable storage device embodying a program of instructions executable by a computer to perform a method for finding a profile of a structure having a dimension in the micron or sub-micron range and fabricated by a process, wherein the system measures the structure by directing a polychromatic beam of electromagnetic radiation at said structure, detecting corresponding radiation data from said beam after it has been modified by the structure at a number of wavelengths to provide measured radiation data; said method comprising:

providing a gallery of a plurality of profile types, each profile associated with a set of one or more parameters and a set of radiation data at the number of wavelengths, wherein at least one of said profile types provided is associated with a plurality of sets of radiation data of different radiation parameters, said different radiation parameters including reflectance or transmittance parameters and ellipsometric parameters;

selecting a profile type from the gallery, at least one radiation parameter and at least one set of radiation data based on sensitivity of such data to a change in the one or more parameters; and

comparing the measured radiation data to the at least one set of radiation data associated with the selected profile type to arrive at a set of value(s) of the one or more parameters of the selected profile type.

103. (Original) A method for transmitting a program of instructions executable by a computer to perform a method for finding a profile of a structure having a dimension in the micron or sub-micron range and fabricated by a process, wherein the system measures the structure by directing a polychromatic beam of electromagnetic radiation at said structure, detecting corresponding radiation data from said beam after it has been modified by the structure at a number of wavelengths to provide measured radiation data; said method comprising:

causing a program of instructions to be transmitted to a client device, thereby enabling the client device to perform, by means of such program, the following process:

providing a gallery of profile types, each profile type associated with a set of one or more parameters and a set of radiation data at the number of wavelengths;

selecting a profile type from the gallery based on information on the process; and

comparing the measured radiation data to the set of radiation data associated with the selected profile type to arrive at a set of value(s) of the one or more parameters of the selected profile type to arrive at a set of value(s) of the one or more parameters.

104. (Currently Amended) A method for transmitting a program of instructions executable by a computer to perform a method for finding a profile of a structure having a dimension in the micron or sub-micron range and fabricated by a process, wherein ~~the system measures the structure~~ a measurement is carried out by directing a polychromatic beam of electromagnetic radiation at said structure, detecting corresponding radiation data from said beam after it has been modified by the structure at a number of wavelengths to provide measured radiation data; said method comprising:

causing a program of instructions to be transmitted to a client device, thereby enabling the client device to perform, by means of such program, the following process:

providing a gallery of profile types, each profile type associated with a set of one or more parameters and a set of radiation data at the number of wavelengths, wherein at least one of said profile types provided is associated with a plurality of sets of radiation data of different radiation

parameters, said different radiation parameters including reflectance or transmittance parameters and ellipsometric parameters;

selecting a profile type from the gallery, at least one radiation parameter and at least one set of radiation data based on sensitivity of such data to a change in the one or more parameters; and

comparing the measured radiation data to the at least one set of radiation data to arrive at a set of value(s) of the one or more parameters.